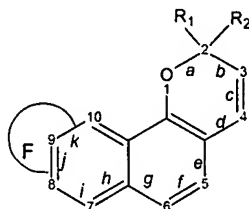


### IN THE CLAIMS

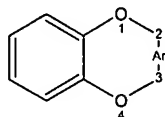
None of the original claims 1-18 have been amended. New claims have been submitted that are further limiting, within the scope of the original claims, and which find antecedent basis in the original disclosure.

1. (ORIGINAL) A photochromic naphthopyran having a central nucleus of the



formula:

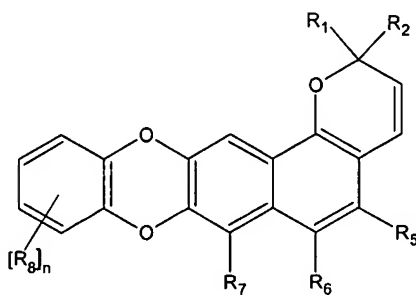
wherein F is a 1,4-benzodioxine ring having the following graphic formulae:



with its 2,3 positions fused to the *i*, *j*, or *k* side;

R<sub>1</sub> and R<sub>2</sub> are atoms or groups providing photochromic properties to the naphthopyran.

2. (CURRENTLY AMENDED) The photochromic naphthopyran of claim 1, characterized in that it has the following structure:



wherein,

R<sub>1</sub> and/or R<sub>2</sub>, independently represent optionally substituted aryl or heteroaryl groups the basic structure of which is selected from those of phenyl, naphthyl, biphenyl, pyridyl, furyl, benzofuryl, dibenzofuryl, N--(C<sub>1</sub>-C<sub>6</sub>)alkylcarbazole, thienyl, benzothienyl, dibenzothienyl, julolidinyl groups; R<sub>1</sub> and/or R<sub>2</sub> advantageously representing a para-substituted phenyl group, said substituents of the phenyl group are selected preferably from the group consisting of alkoxy, dialkylamino, diarylamino, or R<sub>1</sub> and R<sub>2</sub> together form an adamantyl group or norbornyl group or anthracenylidene group; either R<sub>1</sub> or R<sub>2</sub> is mono- or di-substituted phenyl which is substituted in the position para to the connection side with -phenyl, -(CH<sub>2</sub>)<sub>p</sub>-phenyl or -O-(CH<sub>2</sub>)<sub>p</sub>-phenyl substituted, wherein p is an integer from 1 to 6, and the ring of the substituent group forms part of a second photochromic pyran;

R<sub>5</sub> and R<sub>6</sub> are the same or different, and may represent independently

a hydrogen,

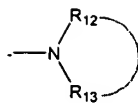
a linear or branched alkyl group that comprises 1 to 6 carbon atoms,

a -C(R<sub>14</sub>)<sub>2</sub>X group, wherein X is hydroxy, alkoxy, benzoyloxy, C<sub>1</sub>-C<sub>6</sub> acyloxy, an amine or amide group: -NH<sub>2</sub>, -NHR<sub>12</sub>, -N(R<sub>12</sub>)<sub>2</sub>, -CONH<sub>2</sub>, -CONHR<sub>12</sub>, -CON(R<sub>11</sub>)<sub>2</sub>, R<sub>14</sub> is hydrogen, C<sub>1</sub>-C<sub>6</sub> alkyl, phenyl or naphthyl with C<sub>1</sub>-C<sub>6</sub> alkyl or C<sub>1</sub>-C<sub>6</sub> alkoxy substituents,

an optionally substituted phenyl or benzyl group,

a -COR<sub>15</sub>, or --COOR<sub>15</sub> group, R<sub>15</sub> representing a linear or branched alkyl group comprising 1 to 6 carbon atoms,

or alternatively, R<sub>5</sub> and R<sub>6</sub> may together form a 5- to 7-member optionally substituted carbocyclic or heterocyclic ring ~~which can comprise~~ comprising a at least one heteroatom selected from oxygen, sulfur, and nitrogen and wherein said ~~The ring may be annelated with one aromatic group. Said~~ substituents are selected from the group consisting of a C<sub>1</sub> to C<sub>6</sub> alkyl group which is linear or branched, a C<sub>1</sub> to C<sub>6</sub> alkoxy group which is linear or branched, and an amine group of formula



wherein  $R_{12}$  and  $R_{13}$ , which are the same or different, independently represent a hydrogen, a linear, branched, or cyclic alkyl group comprising 1 to 6 carbon atoms, an aryl or heteroaryl group consisting of C atoms and a heteroatom selected from the group consisting of N, S or O ring atoms, or representing, together with the nitrogen atom to which they are bound, a 5- to 7-membered ring selected from the group consisting of pyridyl, furyl, benzofuryl, dibenzofuryl, thienyl, and benzothienyl ~~which can comprise at least one other heteroatom selected from oxygen, sulfur and nitrogen~~, said nitrogen atom in the 5- to 7-membered ring being optionally substituted with an  $R_{10}$  group, which  $R_{10}$  is a linear or branched alkyl group comprising 1 to 6 carbon atoms, a phenyl, a benzyl, or a naphthyl group.

$R_7$ , and  $R_8$  are independently

a hydrogen,

a linear or branched alkyl group which comprises 1 to 6 carbon atoms,

a cycloalkyl group comprising 3 to 7 carbon atoms,

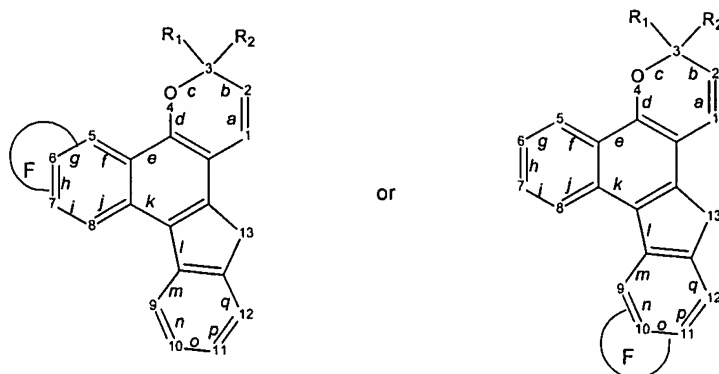
a linear or branched alkoxy group comprising 1 to 6 carbon atoms,

a haloalkyl, halocycloalkyl, or haloalkoxy group where alkyl groups comprise  $C_1 - C_6$  alkyl groups,  $C_1 - C_6$  haloalkoxy groups above respectively, which are substituted with at least one halogen atom, ~~notably~~ selected from fluorine, chlorine and bromine,

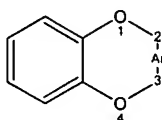
a linear or branched alkenyl or alkynyl group comprising 1-12 carbon atoms, a linear or branched alkenoxy or alkynoxy group comprising 1-12 carbon atoms, and

$n$  is an integer from 0 to 4.

3. (CURRENTLY AMENDED) A photochromic naphthopyran having a central nucleus of the formula



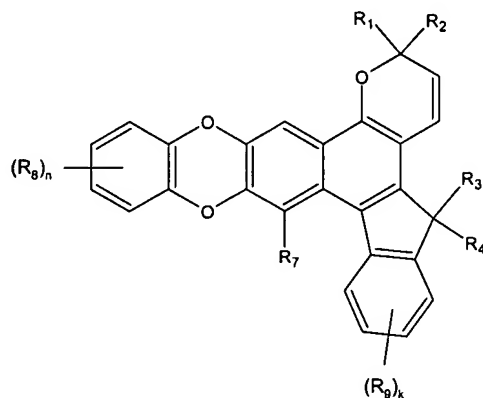
wherein F is a 1,4-benzodioxine ring having the following graphic formulae:



with its 2,3 positions fused to the *i*, *j*, or *k* side;

$R_1$  and  $R_2$  are atoms or groups providing photochromic properties to the naphthopyran, and F, with its 2,3 positions, is fused to the *g*, *h*, *i*, *n*, *o*, or *p* side;

4. (CURRENTLY AMENDED) The photochromic naphthopyran of claim 3, characterized in that it has the following structure



wherein,

~~R<sub>1</sub>, R<sub>2</sub>~~, R<sub>7</sub>, and R<sub>8</sub> are as defined in ~~Claim 2~~, independently

a hydrogen,

a linear or branched alkyl group which comprises 1 to 6 carbon atoms,

a cycloalkyl group comprising 3 to 7 carbon atoms,

a linear or branched alkoxy group comprising 1 to 6 carbon atoms,

a haloalkyl, halocycloalkyl, or haloalkoxy group where alkyl groups comprise C<sub>1</sub> – C<sub>6</sub> alkyl groups, C<sub>1</sub> – C<sub>6</sub> haloalkoxy groups above respectively, which are substituted with at least one halogen atom, notably selected from fluorine, chlorine and bromine,

a linear or branched alkenyl or alkynyl group comprising 1-12 carbon atoms, a linear or branched alkenoxy or alkynoxy group comprising 1-12 carbon atoms, and

n is an integer from 0 to 4,

R<sub>9</sub> independently represents groups as defined for R<sub>8</sub>,

k is an integer ~~are integers~~ from 0 to 2;

R<sub>3</sub> and R<sub>4</sub> are the same or different, and may represent independently

a hydrogen, a hydroxy, a halogen,

a linear, branched, or cyclic alkyl group that comprises 1 to 6 carbon atoms,

a –OR<sub>20</sub> group, wherein R<sub>20</sub> is (C1-C3)alkyl, phenyl(C1-C3)alkyl, mono(C1-C3)alkylphenyl(C1-C3)alkyl, mono(C1-C3)alkoxyphenyl(C1-C3)alkyl, (C1-C3)alkoxy, (C2-C4)alkyl, fluoro(C1-C3)alkyl, chloro(C1-C3)alkyl, or optionally substituted phenyl groups,

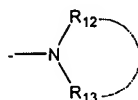
an optionally substituted aryl group, said substituents being mono, di-, or tri-, and selected from group R<sub>20</sub>, and OR<sub>20</sub>,

a –C(R<sub>14</sub>)<sub>2</sub>X group, wherein X is hydroxy, alkoxy, benzoyloxy, C1-C6 acyloxy, an ester group: –COOR<sub>11</sub>, an amine or amide group: –NH<sub>2</sub>, –NHR<sub>12</sub>, –N(R<sub>12</sub>)<sub>2</sub>, –CONH<sub>2</sub>, –CONHR<sub>12</sub>, –CON(R<sub>12</sub>)<sub>2</sub>, R<sub>14</sub> is hydrogen,

C1-C6 alkyl, phenyl or naphthyl with C1-C6 alkyl or C1-C6 alkoxy substituents,

a polyether or polyurea residue,

or R<sub>3</sub> and R<sub>4</sub> together form a 5- to 7-member optionally substituted spiro-cyclic ring ~~which can comprise at least one~~ comprising a heteroatom selected from oxygen, sulfur, and nitrogen, and which spirocyclic ring may be annelated with one or two benzene groups, the substituents on said 5- to 7-member ring being selected from the group consisting of a C1 to C6 alkyl group which is linear or branched, a C1 to C6 alkoxy group which is linear or branched, and an amine group of formula



wherein R<sub>12</sub> and R<sub>13</sub> are selected from the group consisting of hydrogen, a linear, branched, or cyclic alkyl group comprising 1 to 6 carbon atoms, an aryl or heteroaryl group consisting of C atoms and a N, S or O ring atom, or representing, together with the nitrogen atom to which they are bound, a 5- to 7-membered ring selected from the group consisting of pyridyl, furyl, benzofuryl, dibenzofuryl, thienyl, and benzothienyl. as ~~defined in claim 2~~

5. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 1.

6. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 2.

7. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 3.

8. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 4.

9. (ORIGINAL) The photochromic naphthopyran of claim 1 wherein  $R_1$  and  $R_2$  are selected from the group consisting of hydrogen atoms, halogen atoms, and organic groups.

10. (ORIGINAL) The photochromic naphthopyran of claim 1 wherein  $R_1$  and  $R_2$  are selected from the group consisting of hydrogen atoms and organic groups.

11. (ORIGINAL) The photochromic naphthopyran of claim 1 wherein  $R_1$  and  $R_2$  are selected from the group consisting of hydrogen atoms, aliphatic groups, aryl groups, and heterocyclic groups.

12. (ORIGINAL) The photochromic naphthopyran of claim 1 wherein  $R_1$  and  $R_2$  are selected from the group consisting of a) hydrogen atoms, b) a linear or branched alkyl group of 1 to 12 carbon atoms, c) a cycloalkyl group of 3 to 12 carbon atoms, d) an aryl group of 6 to 24 ring carbon atoms, e) a heteroaryl group of 4 to 24 carbon atoms and at least one hetero ring atom selected from sulfur, oxygen and nitrogen; and f) wherein  $R_1$  and  $R_2$  together form a heterocyclic ring.

13. (ORIGINAL) The photochromic naphthopyran of claim 9 wherein the heterocyclic ring formed from  $R_1$  and  $R_2$  is selected from the group consisting of an adamantyl, norbornyl, fluorenylidene, di( $C_1$  -  $C_6$ )alkylanthracenyliidene and spiro( $C_5$  -  $C_6$ )cycloalkylanthracenyliidene group.

14. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 9.

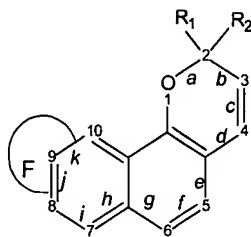
15. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 10.

16. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 11.

17. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 12.

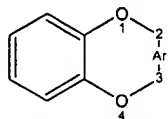
18. (ORIGINAL) A photochromic article comprising a light permeable matrix having applied thereto or dispersed or diffused therein a photochromic amount of a photochromic naphthopyran according to claim 13.

19. (NEW ) A photochromic naphthopyran having a central nucleus of the formula:





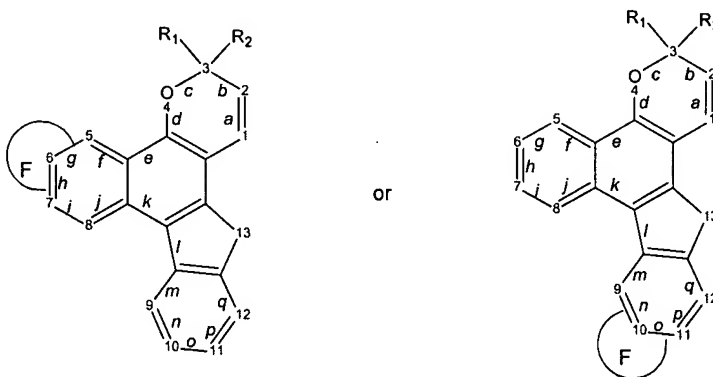
wherein F is a 1,4-benzodioxine ring having the following graphic formulae:



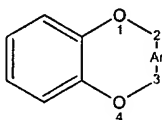
with its 2,3 positions fused to the *i, j, or k* side;

$R_1$  and  $R_2$  are selected from the group consisting of phenyl and substituted phenyl.

20. (NEW) A photochromic naphthopyran having a central nucleus of the formula



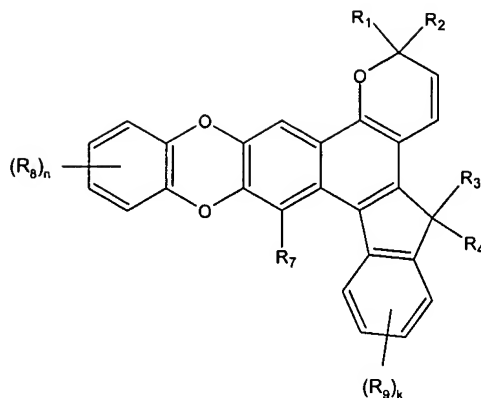
wherein F is a 1,4-benzodioxine ring having the following graphic formulae:



with its 2,3 positions fused to the *i, j, or k* side; and

$R_1$  and  $R_2$  are phenyl groups providing photochromic properties to the naphthopyran, and F, with its 2,3 positions, is fused to the *g, h, i, n, o, or p* side.

21. (NEW) The photochromic naphthopyran of claim 20, characterized in that it has the following structure



wherein,

$R_7$ , and  $R_8$  are independently

a hydrogen,

a linear or branched alkyl group which comprises 1 to 6 carbon atoms,

a cycloalkyl group comprising 3 to 7 carbon atoms,

a linear or branched alkoxy group comprising 1 to 6 carbon atoms,

a haloalkyl, halocycloalkyl, or haloalkoxy group where alkyl groups comprise  $C_1 - C_6$  alkyl groups,  $C_1 - C_6$  haloalkoxy groups above respectively, which are substituted with at least one halogen atom selected from fluorine, chlorine and bromine,

a linear or branched alkenyl or alkynyl group comprising 1-12 carbon atoms, a linear or branched alkenoxy or alkynoxy group comprising 1-12 carbon atoms, and

$n$  is an integer from 0 to 4,

$R_9$  independently represents groups as defined for  $R_8$ ;

$k$  is an integer from 0 to 2;

$R_3$  and  $R_4$  are the same or different, and may represent independently

a hydrogen, a hydroxy, a halogen,

a linear, branched, or cyclic alkyl group that comprises 1 to 6 carbon atoms,

a  $-OR_{20}$  group, wherein  $R_{20}$  is (C1-C3)alkyl, phenyl(C1-C3)alkyl, mono(C1-C3)alkylphenyl(C1-C3)alkyl, mono(C1-C3)alkoxyphenyl(C1-

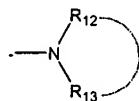
C3)alkyl, (C1-C3)alkoxy, (C2-C4)alkyl, fluoro(C1-C3)alkyl, chloro(C1-C3)alkyl, or optionally substituted phenyl groups,

an optionally substituted aryl group, said substituents being mono, di-, or tri-, and selected from group R<sub>20</sub>, and OR<sub>20</sub>,

a -C(R<sub>14</sub>)<sub>2</sub>X group, wherein X is hydroxy, alkoxy, benzyloxy, C1-C6 acyloxy, an ester group: -COOR<sub>11</sub>, an amine or amide group: -NH<sub>2</sub>, -NHR<sub>12</sub>, -N(R<sub>12</sub>)<sub>2</sub>, -CONH<sub>2</sub>, -CONHR<sub>12</sub>, -CON(R<sub>12</sub>)<sub>2</sub>, R<sub>14</sub> is hydrogen, C1-C6 alkyl, phenyl or naphthyl with C1-C6 alkyl or C1-C6 alkoxy substituents,

a polyether or polyurea residue,

or R<sub>3</sub> and R<sub>4</sub> together form a 5- to 7-member optionally substituted spirocyclic ring which comprising one heteroatom selected from oxygen, sulfur, and nitrogen, and which spirocyclic ring may be annelated with one or two benzene groups, the substituents on said 5- to 7-member ring being selected from the group consisting of a C1 to C6 alkyl group which is linear or branched, a C1 to C6 alkoxy group which is linear or branched, and an amine group of formula



wherein R<sub>12</sub> and R<sub>13</sub> are selected from the group consisting of hydrogen, a linear, branched, or cyclic alkyl group comprising 1 to 6 carbon atoms, an aryl or heteroaryl group consisting of C atoms and one N, S or O ring atoms, or representing, together with the nitrogen atom to which they are bound, a 5- to 7-membered ring selected from the group consisting of pyridyl, furyl, benzofuryl, dibenzofuryl, thienyl, and benzothienyl.